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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/810,810

03/29/2004

Shaowei Zhu

251102US3

9704

22850

7590

08/18/2006

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EXAMINER

DOERRLER, WILLIAM CHARLES

ART UNIT

PAPER NUMBER

3744

DATE MAILED: 08/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/810,810

**Applicant(s)**

ZHU ET AL.

**Examiner**

William C. Doerrler

**Art Unit**

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-16 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3-29-04</u> . | 6) <input type="checkbox"/> Other: ____.  |

**DETAILED ACTION**

***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8,12,15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 8 line 4, "the heat exchange medium" lacks clear antecedent basis. In the penultimate line of claim 12, "the passage forming members" is confusing, as only one passage forming member was previously claimed.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,2,4-7 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bartlett et al.

Looking at Bartlett's valve 58 and heat exchanger 37 as one unit provides all of applicant's claimed structure. Applicant has not clearly claimed that the pressure drops throughout the heat exchanger. As such, Bartlett et al is seen to show a heat exchanger with a pressure drop and heat exchange. In regard to claim 11, the valve 58 of Bartlett et al is seen as the resistive element.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3,8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartlett et al in view of Mei et al.

Bartlett et al disclose applicant's basic inventive concept, a cryogenic cooler with a compressor which powers a precooler and a heat exchanger which drops the pressure

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of the high pressure refrigerant, substantially as claimed with the exception of specifying the relative temperature drop, the dimensions of the pressure drop passage or using a spirally formed passage. Mei et al shows a spirally formed passage heat exchanger with a pressure drop which exchanges heat with the low pressure refrigerant to be old in the refrigeration art. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention from the teaching of Mei et al to form the passage as a spiral to permit a compact heat exchanger with good surface area to perform heat exchange and to provide a long pressure reduction passage to ensure adequate pressure drop of the refrigerant. The pressure of the refrigerant is given in line 66 of column 5 of Bartlett et al.

Claims 10,12,15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartlett et al in view of Flynn.

Bartlett et al disclose applicant's basic inventive concept, a cryogenic refrigerator with a heat exchanger that drops the pressure of the high pressure refrigerant and exchanges heat with the low pressure refrigerant, substantially as claimed with the exception of a spirally shaped passage with heat transfer features (fins made from a wire). Flynn shows this feature to be old in the cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention from the teaching of Flynn to modify the heat exchanger of Bartlett et al by using a spiral passage with heat transfer fins made from a wire to improve the heat transfer between the fluids passing on the inside and the outside of the passage.

Claims 12, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartlett et al in view of Hendricks.

Bartlett et al disclose applicant's basic inventive concept, a cryogenic refrigerator with a heat exchanger that drops the pressure of the high pressure refrigerant and exchanges heat with the low pressure refrigerant, substantially as claimed with the exception of forming the heat exchanger from plates having small holes passing therethrough.

Hendricks shows this feature to be old in the cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention from the teaching of Hendricks to modify the heat exchanger of Bartlett et al by using perforated plates to form the heat exchanger to provide proper fluid flow and heat transfer. In regard to claim 13, since the plates of Hendricks have pores passing through them, the heat exchanger is seen as being formed of a porous body.

#### ***Allowable Subject Matter***

Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

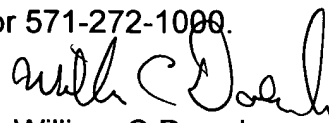
#### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Delacour shows a cryogenic heat exchanger with a means to drop the pressure. Rafolovich Adams and Longworth show heat exchangers which drop the pressure of the refrigerant.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Doerrler whose telephone number is (571) 272-4807. The examiner can normally be reached on Monday-Friday 6:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



William C Doerrler  
Primary Examiner  
Art Unit 3744

WCD